A Report Prepared for:

Downs Engineering, Inc.
and the
City of Chattanooga

Archaeological Survey and Monitoring of the Combined Sewer Overflow Control Facility, Ross's Landing Park, Chattanooga, Tennessee

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Abstract

The Jeffrey L. Brown Institute of Archaeology, University of Tennessee at Chattanooga, was engaged in December, 1990, by Downs Engineering, Inc., on behalf of the City of Chattanooga, to conduct an archaeological reconnaissance of the route of a proposed combined sewer overflow (CSO) conduit extending over 650 meters through Ross's Landing Park on the south bank of the Tennessee River in Chattanooga, Tennessee. On the determination of the Tennessee Historical Commission, the potential for significant historic period archaeological remains within the proposed sewer project was deemed high. An archaeological reconnaissance of the project area and/or mitigative measures was required.

The Institute conducted a limited backhoe testing program in Ross's Landing Park on December 11 and 12, 1990, resulting in the excavation of four backhoe-excavated search trenches. The location of the trenches was conditioned by the substantial depth of modern redeposited fills over buried historic horizons and the need for large areas of undeveloped ground on which to place backhoe spoil. Without cutting access roads in the park, or disturbing buried utility lines, no further testing was feasible.

A progress report on the backhoe testing program was submitted to the sponsor in December, 1990, outlining the results of the four test pits and the difficulty encountered in sampling deeply buried historic components without more extensive trenching and necessary removal of modern access roads and utilities. In lieu of further programmed testing by backhoe, the Institute recommended monitoring of the CSO trenching during construction, at which time logistical considerations pertaining to continued park use could be met.

Daily monitoring of the trench excavation by R. B. Council began November 20, 1991, and continued until February 21, 1992, on which date periodic inspection of the site by N. Honerkamp continued until completion of the CSO conduit in the fall of 1992. Numerous architectural and structural features were exposed in the excavation of the conduit, as well as scattered artifacts principally of an industrial character. Of particular interest was a natural ravine running through the Landing that had been backfilled in the 1870s and 1880s by debris from a sawmill and furniture manufacturing plant.

No resources eligible for inclusion in the National Register of Historic Places were encountered. Site impacts in the late 1960s and early 1970s had seriously disturbed the area of Ross's Landing Park, leaving only scattered finds of limited extent.

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Introduction

In order to meet Federal standards respecting water quality, the city of Chattanooga, Tennessee has begun a construction program aimed at reducing the periodic discharge of untreated sewage into the Tennessee River. The existing sewer system of the city is a combined system, meaning that storm sewer runoff in part propells and is mixed with sanitary sewer effluent prior to admission to the city's sewage treatment plant on Moccasin Bend. At times of peak rainfall, the volume of water and effluent in the combined sewer mains exceeds carrying capacity, forcing the discharge of the surplus untreated effluent into the Tennessee River. In order to resolve this problem, the city is constructing a series of underground combined sewer overflow transport and storage facilities at key points in the town. These high-volume, specially-designed conduits are intended to temporarily store the excess effluent until the treatment plant can absorb the load.

The first of these important new sewers, covered by the acronym CSO facilities, was constructed at Ross's Landing, a public recreational park on the Tennessee River waterfront and extending west from the foot of Broad Street to the city-operated marina several thousand feet to the west. The Ross's Landing combined sewer overflow facility, here designated RL-CSO, would extend from the foot of Chestnut Street west to a point past the marina, thence extend in part into the river.

As part of the review of the project proposal by the Tennessee Historical Commission, the State Historic Preservation Officer determined that there was the potential of encountering significant archaeological remains at Ross's Landing. An historical survey document funded by the RiverCity Company as part of the planning process on the nearby Tennessee Aquarium documented historic land use patterns in the Ross's Landing area (see Council 1989). The Commission called for a plan to archaeologically survey the proposed CSO right of way to determine if remains eligible for inclusion in the National Register of Historic Places were present, and to mitigate the impact on these resources.

The Institute of Archaeology, University of Tennessee at Chattanooga, submitted a technical proposal and budget for a program of secondary archaeological testing in the proposed project corridor. Initial test trenches dug by backhoe demonstrated the great depth of modern fill over early 19th century ground surfaces. Due to spatial restrictions, the backhoe testing could not be carried out except in a very few locations of the Ross's Landing Park. Subsequently the testing program was converted into a monitoring effort during the actual construction.

Monitoring of the trench construction began in November, 1991, at which time the trench had been carried out of the rights-of-way of Chestnut Street and Riverfront Parkway and into the Ross's Landing Park. The project was initially monitored by R. Bruce Council, Research Associate, who observed construction of the first 800 feet of the project and the last 200 feet where the conduit entered the Tennessee River. In February 1992, Dr. Nicholas Honerkamp assumed monitoring responsibilities on the project, and observed construction to the end of trenching activities late in the summer of 1992. The CSO sewer was opened shortly before the end of that year.

While the construction of the RL-CSO did not encounter any <u>in situ</u> remains potentially eligible for inclusion in the National Register, several features and geological structures of interest were encountered. This report documents the testing and monitoring that occurred.

Historical Synopsis of Ross's Landing

At hand at the start of the project was an historical survey of the waterfront area of Ross's Landing prepared during the planning stages of the nearby Tennessee Aquarium. Ross's Landing at Chattanooga: A Cultural Resource History of the Chattanooga Waterfront, by Council (1989), provided a capsule summary of the major historic usages of the waterfront area at Ross's Landing. Although the RL-CSO project corridor was not specifically addressed in this document, all of the CSO project area was subsumed in the study area. This document was a survey-level historical treatment and not an intensive site-specific historical reconstruction.

The pre-Columbian history of the Ross's Landing area is poorly known, and the area was intensively developed in the historic period prior to any systematic archaeological surveying. The landing is on the inside bend of a major meander in the Tennessee River (see Figure 1). The river turns sharply around the foot of Cameron Hill from a westerly course to a southerly one. There is only a narrow remnant of a flat flood terrace on the left bank beneath Cameron Hill, while the opposite shore has more capacious flood terraces. Cameron Hill is joined on the south by a low ridge line, and flanked on the east by a smaller hill.

To the east of Cameron Hill, at a distance of about three quarters of a mile, is a low ridge line termination on the river in the limestone bluffs overlooking Maclellan Island. The low-lying ground between these two major ridge lines was the historic heart of the town of Ross's Landing and Chattanooga. The pre-Columbian drainage in the area was from south to north, to the river. Civil War period plans document the presence of a seasonal (?) water course meandering from 8th Street north along Broad Street to the vicinity of 2nd Street, where the stream turned west of north and entered the river near the current location of the Olgiati Bridge (see Figure 2). This early geological feature survived into the 1880s, when modern filling buried this relict stream bed.

Major Mississippian sites, and earlier aboriginal components, are known on Moccasin Bend downstream of the project area, and Woodland and Mississippian sites are documented on the right bank of the river, upstream of Ross's Landing, at Heritage Place (see Honerkamp 1984; Council and Honerkamp 1990). Cherokee habitations are not documented in the project area until the historic period. John Ross, of mixed Scottish-Cherokee ancestry, opened a trading post and river ferry near the foot of modern Market Street in 1815. Ross gave his name to the ferry landing and to the settlement that emerged at the landing.

With the Cherokee Removal in 1838, Ross's Landing assumed commercial significance as the town wharf, and Chattanooga was the lowest landing of any importance at that date on the Upper Tennessee River, (that portion of the stream above Mussel Shoals, Alabama). Chattanooga took its name in 1839, the same year the Western and Atlantic Railroad announced it would run a rail line from Atlanta to the hamlet at Ross's Landing.

A number of small businesses, several related to the river trade, utilized the riverbank from the foot of Market Street to the area near the Olgiati Bridge. The Western and Atlantic Railroad intended to extend a spur line from the railyards south of M. L. King Boulevard (9th Street) to the landing to connect river and rail transport. The drainge ravine or seasonal stream mentioned earlier forestalled this effort, and Mulberry Street a.k.a. Railroad Avenue (now Broad Street) housed a spur tract only as far as 5th Street in the antebellum period.

During the Civil War, considerable attention was focussed on Ross's Landing. Confederate forces at Chattanooga had been outflanked by Federal armies and forced to retire south, abandoning the town. In September, 1863, Federal troops occupied the town, and after the disaster at Chickamauga, these forces were under seige within Chattanooga. Numerous gun emplacements, redoubts, and rifle pits surrounded the city. On the waterfront, a line of rifle pits was excavated between the foot of Pine Street and the mouth of the ravine (see Figure 2). One warehouse on the riverbank between the foot of Chestnut

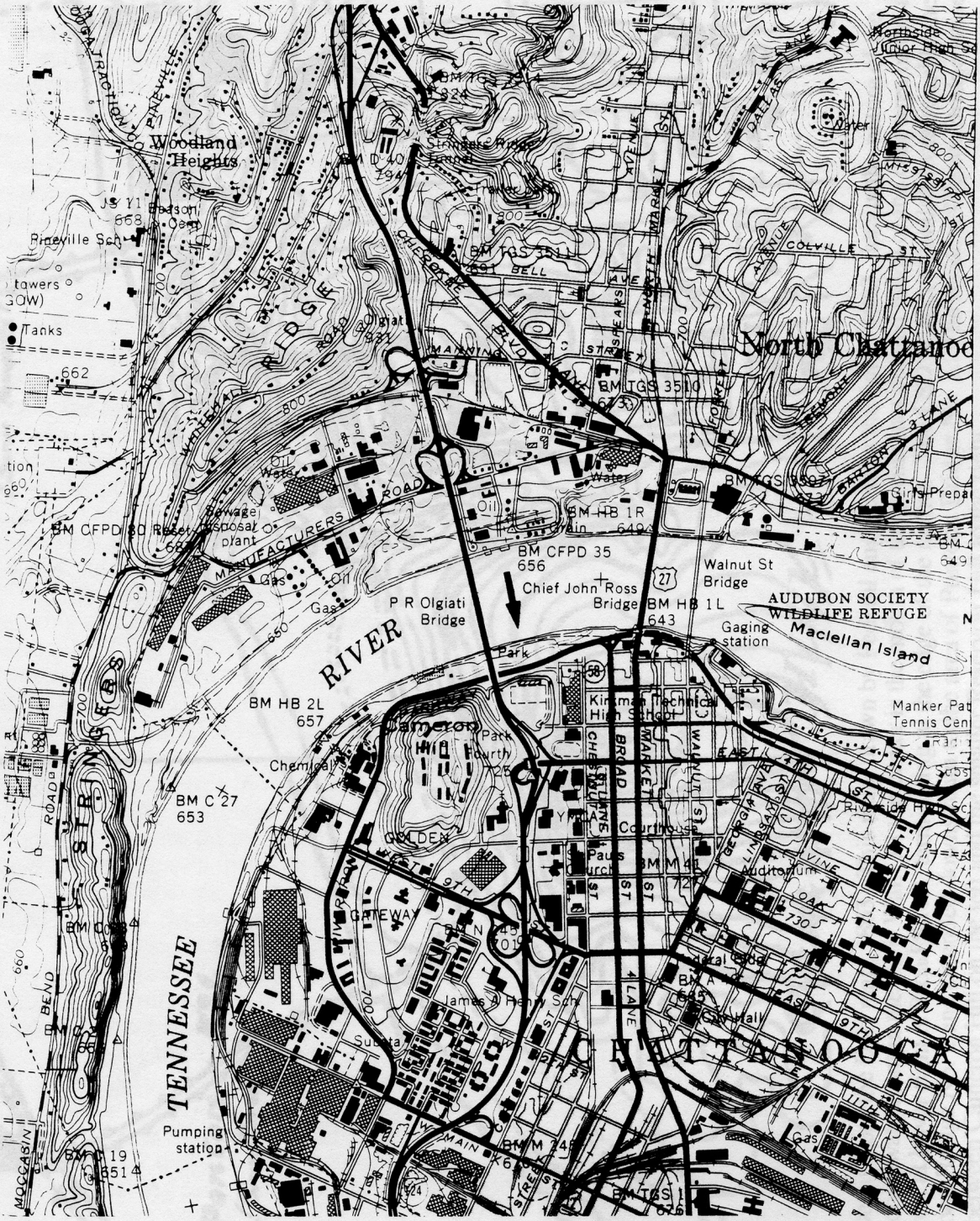

Figure 1. Project vicinity map, from the USGS - TVA topographic quadrangle map, Chattanooga, 105-SE.

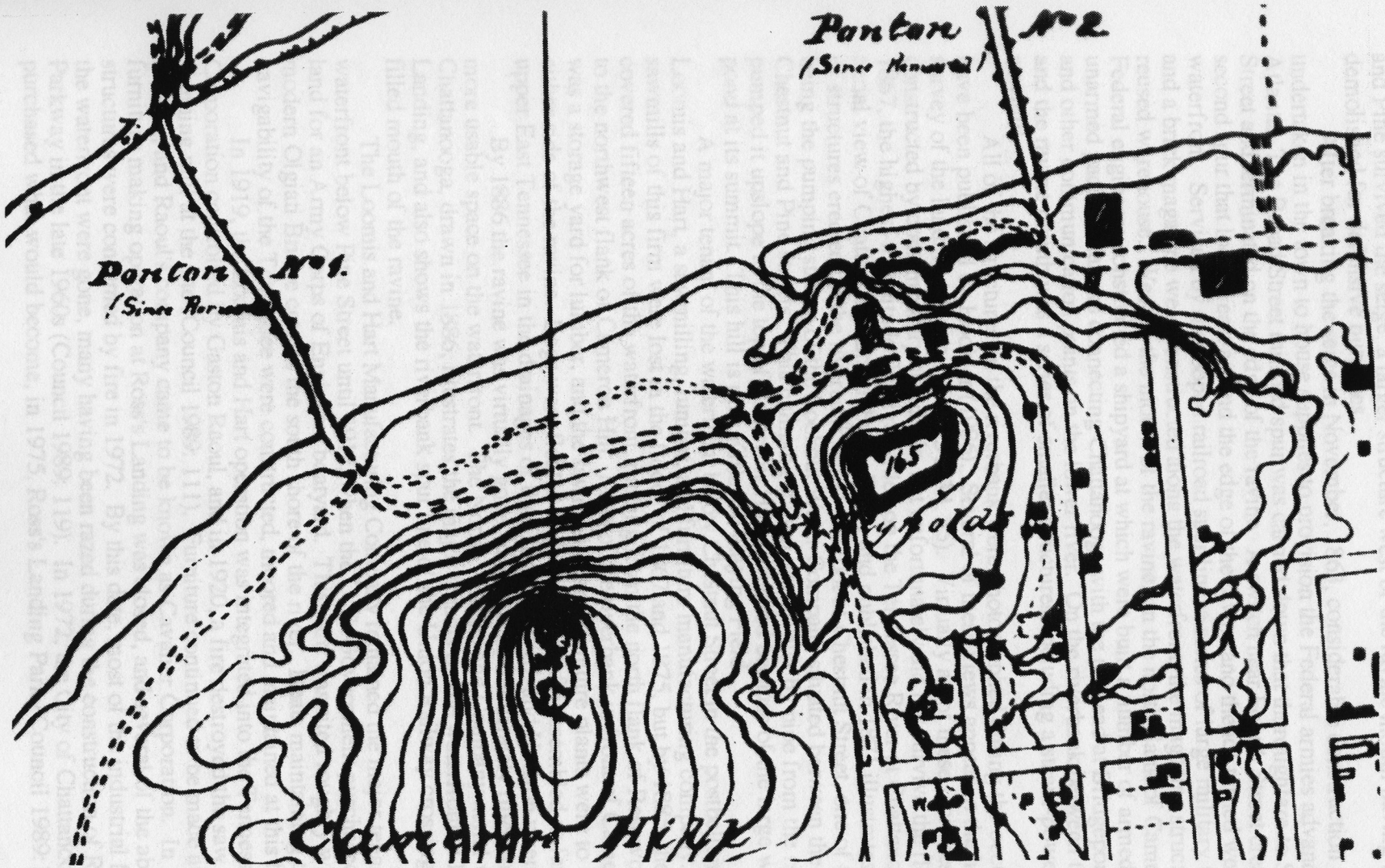

Figure 2. Detail from the Dorr map, 1863. This map, drawn by Federal engineers in the fall of 1863, details the nature of the Chattanooga waterfront in the Civil War. At top center is the mouth of the ravine that drained much of the core area of the town. The wide street at lower right is Broad Street, terminating at the edge of the ravine. The CSO project extended from roughly the landing of Pontoon Bridge No. 2 and extended downstream to the area of Pontoon Bridge No. 1. The modern Olgiati Bridge passes through the cut between Cameron Hill on the left and the smaller Reservoir Hill to the right.

and Pine survived the seige, a larger structure west of the ravine mouth having been demolished for defensive purposes.

After breaking the seige in November, 1863, considerable construction was undertaken in the town to house supplies to provision the Federal armies advancing on Atlanta. The Broad Street railroad spur was carried down that thoroughfare to Second Street and terminated on the edge of the ravine. A switch near Fourth Street created a second spur that looped east around the edge of the ravine and thence turned west along the waterfront. Serviced by the looped railroad spur line, a series of large military warehouses and a brick magazine were constructed along the waterfront, the magazine structure being a reused warehouse. West of the mouth of the ravine, on the north flank of Cameron Hill, Federal engineers constructed a shipyard at which were built a number of armed and unarmed paddle steamers connecting Chattanooga with the railhead at Bridgeport, Alabama and other communication points on the lower river. On the riverbank between the shipyard and the ravine mouth was a series of smaller structures, including a steam-powered sawmill.

All of the structures on the riverbank were photographed during the occupation, and have been published by Hoobler (1986). Several of these views appear in the historical survey of the landing (Council 1989: 31, 34, 35). Virtually all of these facilities were well constructed by contemporary standards, but unfortunately did not survive the flood of 1867, the highest-magnitude flood recorded on the Tennessee River at Chattanooga. The aerial view of Chattanooga drawn by A. Ruger and published in 1871 illustrates the variety of structures erected on the riverbank below the foot of Chestnut Street, one of the largest being the pumping station of the Lookout Water Company situated between the foots of Chestnut and Pine streets. This pumping station drew water by pipe from the river and pumped it upslope to the top of Reservoir Hill, so named because of the large water storage pond at its summit. This hill is now Kirkman Playing Field.

A major tenant of the waterfront below Chestnut Street in the postbellum era was Loomis and Hart, a sawmilling, lumber, and furniture manufacturing company. Early sawmills of this firm were lost in the floods of 1867 and 1875, but by 1885, the plant covered fifteen acres of the waterfront, running from the north flank of Reservoir Hill west to the northwest flank of Cameron Hill. Most of the riverbank in front of Cameron Hill was a storage yard for lumber, and the sawmilling and furniture plants were to the east, on either side of the ravine. Logs were floated to the plant in rafts assembled as far away as upper East Tennessee in the drainages of the Clinch, Powell, and Holston rivers.

By 1886 the ravine was virtually gone, having been deliberately filled to create more usable space on the waterfront. The Norris, Wellge and Company aerial view of Chattanooga, drawn in 1886, illustrates the major tenants on the waterfront at Ross's Landing, and also shows the riverbank spur line of the Union Railway crossing the then-filled mouth of the ravine.

The Loomis and Hart Manufacturing Company remained the major tenant of the waterfront below Pine Street until 1912, when the U. S. Government purchased a tract of land for an Army Corps of Engineers boatyard. This yard was sited roughly where the modern Olgiati Bridge crosses the south shore of the river. Boats maintaining the navigability of the Tennessee were constructed, moored and maintained at this facility.

In 1919, the Loomis and Hart operation was integrated into the Tennessee Furniture Corporation controlled by Gaston Raoul, and in 1920, a fire destroyed the saw and planning mill at the site (Council 1989: 111). Furniture continued to be made at the landing, and Raoul's company came to be known as Cavalier Corporation. In 1961, the furniture making operation at Ross's Landing was closed, and several of the abandoned structures were consumed by fire in 1972. By this date, most of the industrial facilities on the waterfront were gone, many having been razed during the construction of Riverfront Parkway in the late 1960s (Council 1989: 119). In 1972, the City of Chattanooga purchased what would become, in 1975, Ross's Landing Park (Council 1989:123).

Modern Impacts in the Project Area

Substantial ground-altering activities had taken place to the historic waterfront at Ross's Landing prior to construction of the CSO conduit. The construction of Riverfront Parkway in the late 1960s, and the creation of Ross's Landing Park in the early 1970s resulted in the demolition of all the standing architecture in the project area and the wholesale alteration of ground contours.

These impacts not withstanding, the Tennessee Historical Commission determined that there was still the potential for significant subsurface remains at Ross's Landing, particularly deeply-buried features and artifacts in the ravine that had once passed through the project area.

The Backhoe Testing Program, December, 1990

On December 11 and 12, 1990, the Jeffrey L. Brown Institute of Archaeology conducted preliminary archaeological testing of the proposed route of the combined sewer overflow conduit planned to run from the intersection of Chestnut Street and Riverfront Parkway, and extending westerly a distance of 2400 feet along the latter thoroughfare to a point west of the marina (Figure 3). The bulk of the proposed conduit occurs within the southern margins of John Ross Park. The testing was contracted for by Downs Engineering, a local engineering consulting firm, and undertaken for the project designers Camp Dresser and McKee on behalf of the city of Chattanooga.

Following established protocols for archaeological testing of urban and floodplain sites, the Institute excavated four search trenches placed opportunistically in accessible greenspaces within the John Ross Park. Anticipating the depth of modern fill in the floodplain, the tests were cut with a backhoe. Backhoe services were provided by James Agnew Contractor Inc., the low-bid vendor for backhoe services; the firm has previous experience with the Institute and archaeological reconnaissances.

Two of the test trenches, designated A and B, were situated west of the marina at the west end of the park, and near the egress point of the proposed combined sewer. Trenches C and D were placed adjacent to Riverfront Parkway at points east of the Olgiati Bridge overpass (Figure 4).

Trench A was 8.6m (28.2') in length at ground surface and was carried to a maximum depth of 3.8m (12.5') below current ground surface. Buried A horizon topsoils were encountered at a depth of 2.7m to 2.8m (8.9' - 9.2') below a layer of modern fill. Buried A horizon soils produced several historic period artifacts, and evidence of deposits of coal and coal combustion by-products (Table 1). Culturally sterile clays were exposed in the base of the profile.

Trench B, situated immediately south of Trench A, was 8.5m (27.9') long at ground surface and carried to a depth of 3.2m (10.5'). Buried beneath 1.5m to 1.6m (4.9' - 5.2') of modern fills, buried A horizon soils produced a small number of aboriginal flint tools and miscellaneous flakes see Table 1). Culturally sterile clays were exposed in the base of the profile.

Trench C was 6.0m (19.7') long at ground surface and was 5.5m (18.0') in depth at its deepest point. No buried A horizon soils were noted in the profile. Industrial debris consisting of sawmill byproducts (wood scraps and sawdust) were present in high density below 3.0m (11.4) below ground surface. Culturally sterile soils were not reached in this unit, the deposits exceeding in depth the excavation limit of the backhoe. No artifacts were collected from this unit.

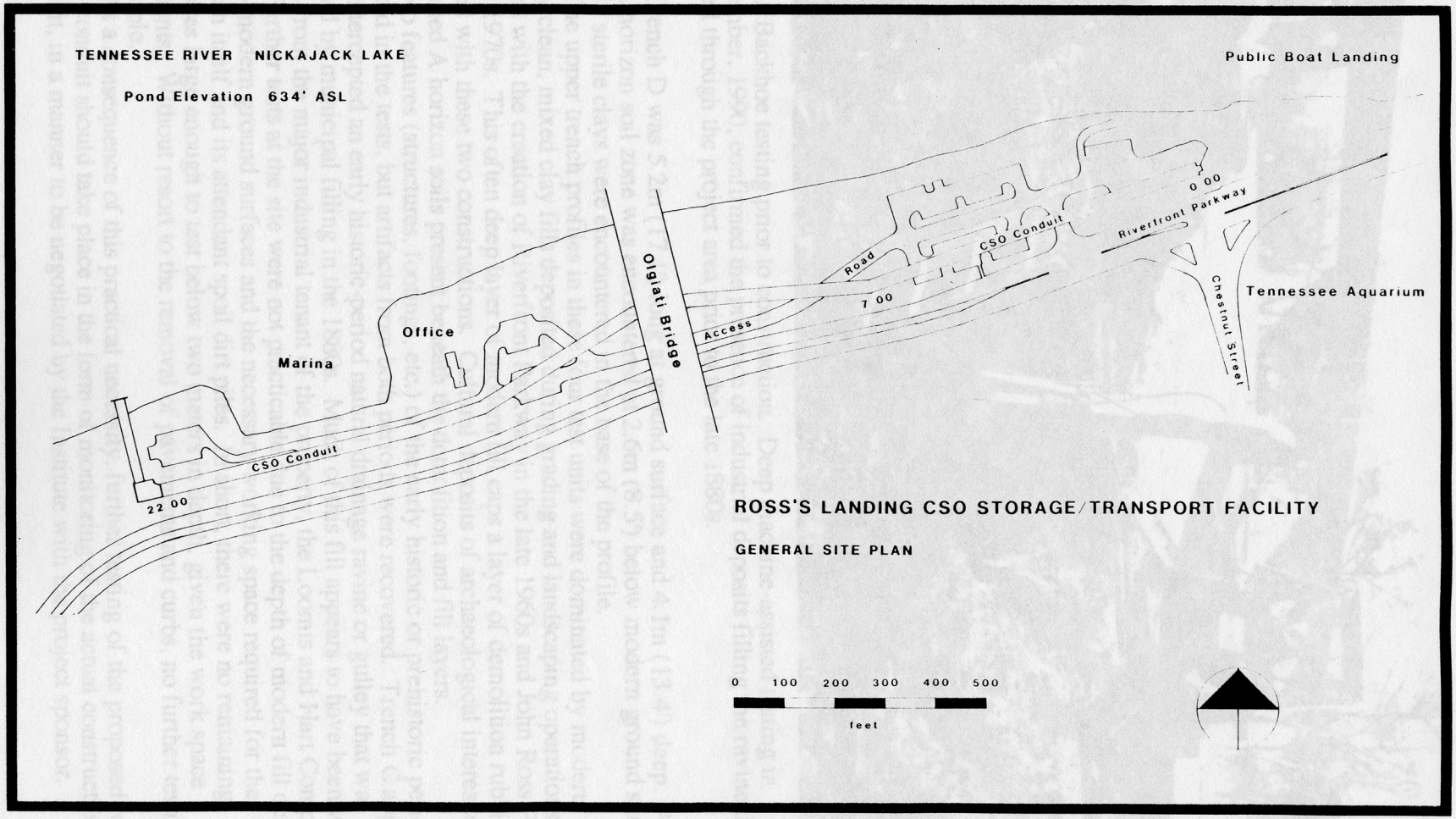

Figure 3. General layout of the CSO conduit through Ross's Landing Park. The conduit trench exposed the antebellum ravine in two places, both in the first one thousand feet of the project.

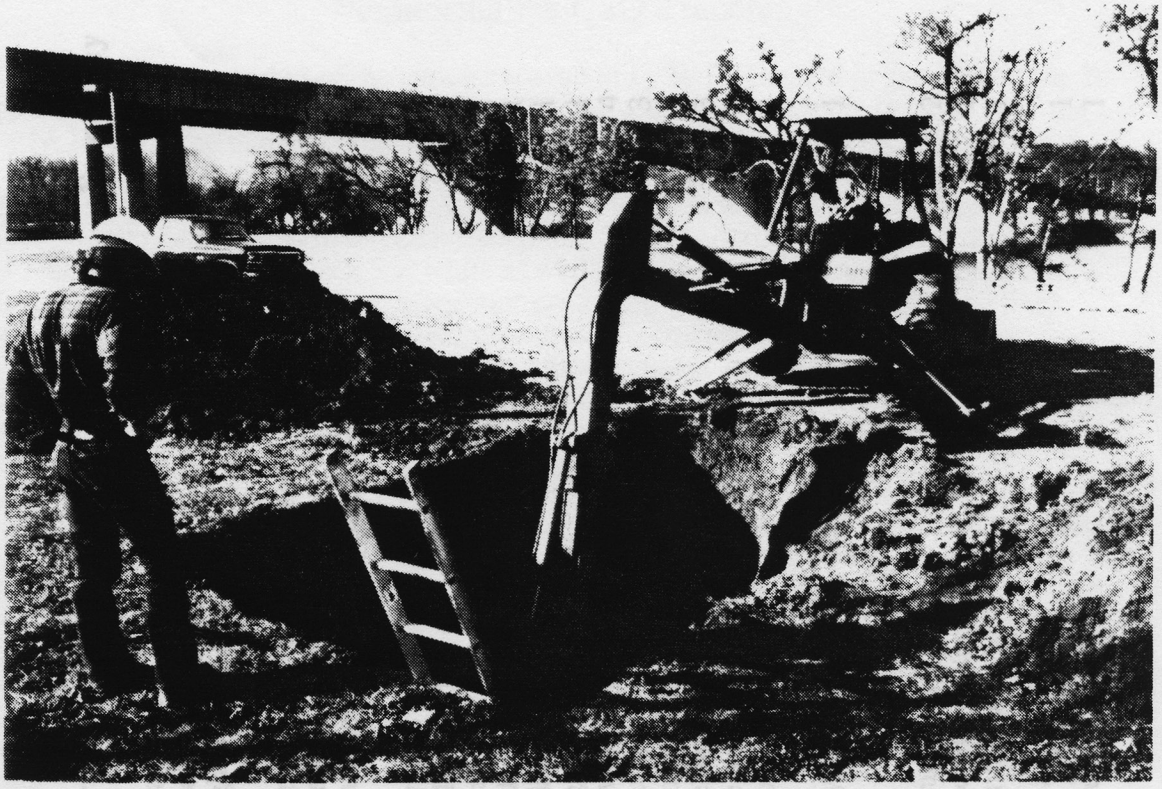

Figure 4. Backhoe testing prior to construction. Deep machine-assisted testing in December, 1990, confirmed the presence of industrial deposits filling the ravine that passed through the project area prior to the late 1880s.

Trench D was 5.2m (17.1') long at ground surface and 4.1m (13.4') deep. A buried A horizon soil zone was encountered at 2.6m (8.5') below modern ground surface. Culturally sterile clays were encountered in the base of the profile.

The upper trench profiles in these four test units were dominated by modern, relatively clean, mixed clay fills deposited during grading and landscaping operations associated with the creation of Riverfront Parkway in the late 1960s and John Ross Park in the early 1970s. This often deep layer of modern fill caps a layer of demolition rubble associated with these two constructions. Cultural deposits of archaeological interest occur in the buried A horizon soils present beneath the demolition and fill layers.

No features (structures, footings, etc.) of the early historic or prehistoric periods were noted in the tests, but artifacts from both periods were recovered. Trench C appears to have intercepted an early historic-period natural drainage ravine or gulley that was obliterated by municipal filling in the 1880s. Much of this fill appears to have been waste products from the major industrial tenant of the property, the Loomis and Hart Company.

Further tests at the site were not practicable due to the depth of modern fill deposits over pre-modern ground surfaces and the necessary working space required for the excavation itself and its attendant spoil dirt piles. In short, there were no remaining greenspaces large enough to test below two meters in depth, given the work space requirements. Without resort to the removal of pavements and curbs, no further testing was feasible.

As a consequence of this practical necessity, further testing of the proposed route of the CSO conduit should take place in the form of monitoring of the actual construction of the conduit, in a manner to be negotiated by the Institute with the project sponsor.

Table 1. Field specimen list, 1990 test excavations.

Field Specimen No.	Provenience	Description	Frequency
1	Trench A, unassociated	coal fragment	1
		furnace glass fragment	1
		clear glass bottle base	1
		amber bottle glass, embossed	1
		clear glass bottle base, embossed	1
		earthenware soil pipe, glazed	2
		white,undecorated semi-porcelain sherds	4
2	Trench A, undisturbed top soil layer	leather shoe scrap	1
		blue glass marble	1
		coal fragment	1
		burned shale fragment	1
		gray slate fragment	1
		geological core sample	1
		clear window glass fragments	4
		6" boat spike, wrought iron	3
		3/4" rod stock, iron	1
		square, machine-cut nails, 5", iron	3
		square, machine-cut nail, 4.5", iron	1
		13" iron carriage bolt	1
3	Trench A, charcoal layer under top soil layer	UID type iron nail	1
4	Trench B, top soil layer	coal fragments	2
		worked flint flakes	2
		flint drill base	1
5	Trench D, demolition zone	heavy T-rail, iron	1
		iron, rebar	1

Monitoring the CSO Trenching

Daily monitoring of the trench excavation by R. B. Council began November 20, 1991, and continued until February 21, 1992, on which date periodic inspection of the site by N. Honerkamp continued until completion of trench cutting for the CSO conduit.

Features documented during the trench excavation were assigned numbers, and a master feature list was maintained. Locations of features was made with respect to the approximate linear centerline coordinates of the CSO conduit. Photographic documentation of features was done in black and white as well as color. Artifacts and features were described in narrative notes. Artifacts retrieved from the conduit were assigned field specimen numbers recorded in a field specimen catalog (see Table 2).

Due to budget constraints, full-time monitoring of the trenching was not practicable. Instead, site inspections were conducted daily on an opportunistic basis, depending on the pace of trench excavation and the appearance of significant features, debris layers, or artifacts in the trench cut.

The Ross's Landing sewage transport and storage facility was a subterranean twin-chambered conduit of reinforced concrete construction. The overall width of the conduit was 27 feet, and was intended to be completely subterranean for all but a few yards of its length. The construction of the conduit entailed a very deep and very broad initial trench excavation. Completed in 54' lengths, the construction followed a cycle of gross trench excavation, finished excavation and grading, substructural gravelling, form erection and pouring (Figure 5). After initial on-site storage of some site fills, particularly clean topsoils or uniform debris-free clay subsoils, most of the excavated fills were removed from the site. As initial sections of the conduit were completed, the recycling of fills was begun, transporting freshly excavated dirt at one end of the project to backfill completely cured sections of the conduit.

In order to meet OSHA safety requirements as to baulk depth versus slope, a trench in excess of 100 feet or 30m wide at ground surface was typical. Trench depths varied greatly, but averaged about 30 feet or 10m below local ground surface. The necessity to slope trench walls at a 1 to 1 ratio, and to remove loose debris from the trench profile, resulted in considerable difficulty to the monitors vis a vis accessing features exposed high in the trench profile. Often, features could not be inspected closely. Moreover, visibility was often very poor, both in the walls and floor of the trench.

Foundations and Footings

The initial four hundred feet of the conduit excavation left exposed in profile a number of brick and stone footings and foundations. These footings were only short remnants of much more expansive foundations erased on the south by Riverfront Parkway and on the north by an access road to the public boat landing. In a narrow strip of sloping ground, short sections of foundations running north-south were exposed. These foundation remnants, projecting north from the soil bank along Riverfront Parkway, were photographically documented. One such example of an early limestone foundation is shown in Figure 6, and may be the remant of the Lookout Water Company's pumping station built in the early 1870s. Other foundations in the area were more modern brick footings, but were not attributed to specific structures.

The Broad Street Ravine

The RL-CSO trenching intercepted the remnants of the deep ravine that had originally drained much of the downtown area of Chattanooga. This pre-Columbian geological feature was probably a seasonal stream bed for much of its upper reaches, but its lower length was evidently filled by the river at all but extreme low water levels. This

Table 2. Field specimen catalog, 1991-92 field collection.

Provenience	FS No.	Item No.	Description and Frequency
Trench fill, 2+00	1	1	iron, pick head
Feature 8 associated	2	1	iron, 6" boat spike
Feature 7 associated	3	1	bricks, (4)
		2	iron and wood, folding pocket knife
		3	iron, spike
		4	iron, strap iron fragment
Feature 10 associated	4	1	bricks, (4)
		2	iron, (2) masonry anchor bolts and plates
Trench fill, 23+50	5	1	ceramic, (3) undecorated whiteware sherds
		2	coal, sample
		3	iron, puddled fragment
		4	iron, 5/8" bar stock fragment
		5	iron, 6" boat spike
		6	iron, 7" boat spike
		7	iron, (5) wrought-iron spikes
		8	iron, (2) 20" carriage bolts, with washers
		9	ceramic, undecorated whiteware sherd
		10	iron, 6" boat spike
		11	iron, (3) wrought-iron spikes
		12	iron, 3/8" machine bolt
Trench fill, 4+00	6	1	iron, light T-rail
Trench fill, 5+00	7	1	iron, eyebolt anchor
Trench fill, 6+00	8	1	iron, cast-iron face gear
Feature 14 associated	9	1	iron, rebar fragment
Trench fill, 6+80	10	1	iron, wrought-iron splice plate

Table 2. Field specimen catalog, 1991-92 field collection, continued.

Provenience	FS No.	Item No.	Description and Frequency
Wood debris, 6+20	11	1	iron, (2) 3" machine-cut square nails
Trench floor, gray clay, 6+50	12	1	iron, (2) 5" machine-cut square nails
Wood debris, 6+50	13	1	wood, bow-shaped furniture leg
		2	iron, 19" drift pin
		3	iron, cast-iron machine plate
Floor grade cut, 7+00	14	1	wood, turned bed post
		2	wood, bed (?) post/leg
		3	wood, turned form, handle (?)
		4	wood, composite form, UID
		5	wood, bearing block
		6	leather, belt fragment, perforated
		7	leather, 8" drive belt, with brass studs
Redeposited fill, ravine, 7+00	15	1	wood, bucket stave, shaped
		2	wood, spindle
		3	wood, turned handle
		4	wood, turned form, UID
		5	iron, D-ring
		6	steel, chipper (?) blade
		7	iron, 5" ring
Deep cut, 7+10	16	1	wood, bed post
		2	ceramic, redware vessel base
Ravine fill, 7+50	17	1	wood, spindle
		2	wood, stile/spindle
		3	ceramic, door knob
		4	iron, file cut as gauge (?)
		5	iron, tanged mill file
Feature 15 associated	18	1	glass, small pharmaceutical bottle
		2	iron, (4) 3.25" machine-cut square nails

Table 2. Field specimen catalog, 1991-92 field collection, continued.

Provenience	FS No.	Item No.	Description and Frequency
Ravine fill, floor cut, 7+50	19	1	wood, spindle
		2	wood, spindle
		3	wood, spindle
Upper fills, 7+00 to 8+00	20	1	iron, D-ring
		2	brick, glazed, "Hallwood Block, Pat."
		3	brick, vitrified, "Portsmouth Granite"
		4	iron, 12" triangular file
		5	iron, UID machine part
Feature 16 trenches	21	1	leather, 6" drive belt, with brass studs
		2	iron, mule shoe
Upper fill, 8+00	22	1	iron, cast-iron shaft bearing plate
Upper fill, 8+50	23	1	iron, cast-iron industrial railway wheel
Ravine fill, 8+00 to 8+50	24	1	iron, 30" diameter 5" belt pulley
Deep cut, 7+20	25	1	wood, yoke (?) fragment
		2	wood, table leg
Ravine fill, 8+50 to 9+00	26	1	wood, spindle
		2	wood, spindle
		3	wood, furniture leg
		4	wood, cut-out remnant
		5	wood, cut-out remnant
		6	wood, spindle
		7	wood, spindle
		8	wood, spindle
		9	wood, spindle
		10	wood, spindle
		11	wood, spindle
		12	wood, spindle

Table 2. Field specimen catalog, 1991-92 field collection, continued.

Provenience	FS No.	Item No.	Description and Frequency
Ravine fill, 8+50 to 9+00	26	13	wood, spindle
		14	wood, spindle
		15	wood, spindle
		16	wood, spindle
		17	wood, spindle
		18	wood, spindle
		19	wood, turned form, UID
		20	wood, spindle
		21	wood, spindle
		22	wood, spindle
		23	wood, spindle
		24	wood, spindle
		25	wood, spindle
		26	wood, spindle
		27	wood, cut-out remnant
		28	wood, cut-out remnant
		29	wood, turned form, UID
		30	leather, 16" drive belt fragment, brass studs
		31	leather, 3" drive belt fragment, brass studs
		32	leather, 4" drive belt fragment, brass studs
		33	leather, drive belt fragment, brass studs
		34	leather, 7" drive belt fragment, brass studs
		35	iron, mule shoe
		36	iron, cast-iron frame fragment
		37	copper, pan or cover
		38	glass, clear fire grenade (?) fragment
		39	leather, shoe/boot
		40	iron, kettle
		41	iron, UID object
		42	glass, whiskey bottle
		43	ceramic, stoneware bottle
		44	iron, 1.5" diameter shaft, with square head
Ravine fill, unassociated	27	1	wood and iron, pole with hook

Table 2. Field specimen catalog, 1991-92 field collection, continued

Provenience	FS No.	Item No.	Description and Frequency
Upper fill, 8+50 to 9+00	28	1	iron, mule shoe
		2	brick, "Aetna Steel"
Ravine fill, 8+44 to 8+92	29	1	wood, spindle
Upper fill, 8+44 to 8+92	30	1	ceramic, porcelain tube insulator, "Thomas"
Upper fill, 8+92 to 9+40	31	1	iron, very light T-rail
		2	iron, very light T-rail
Clay zone above ravine fill, 8+92 to 9+40	32	1	wood, feathered shingles (8)

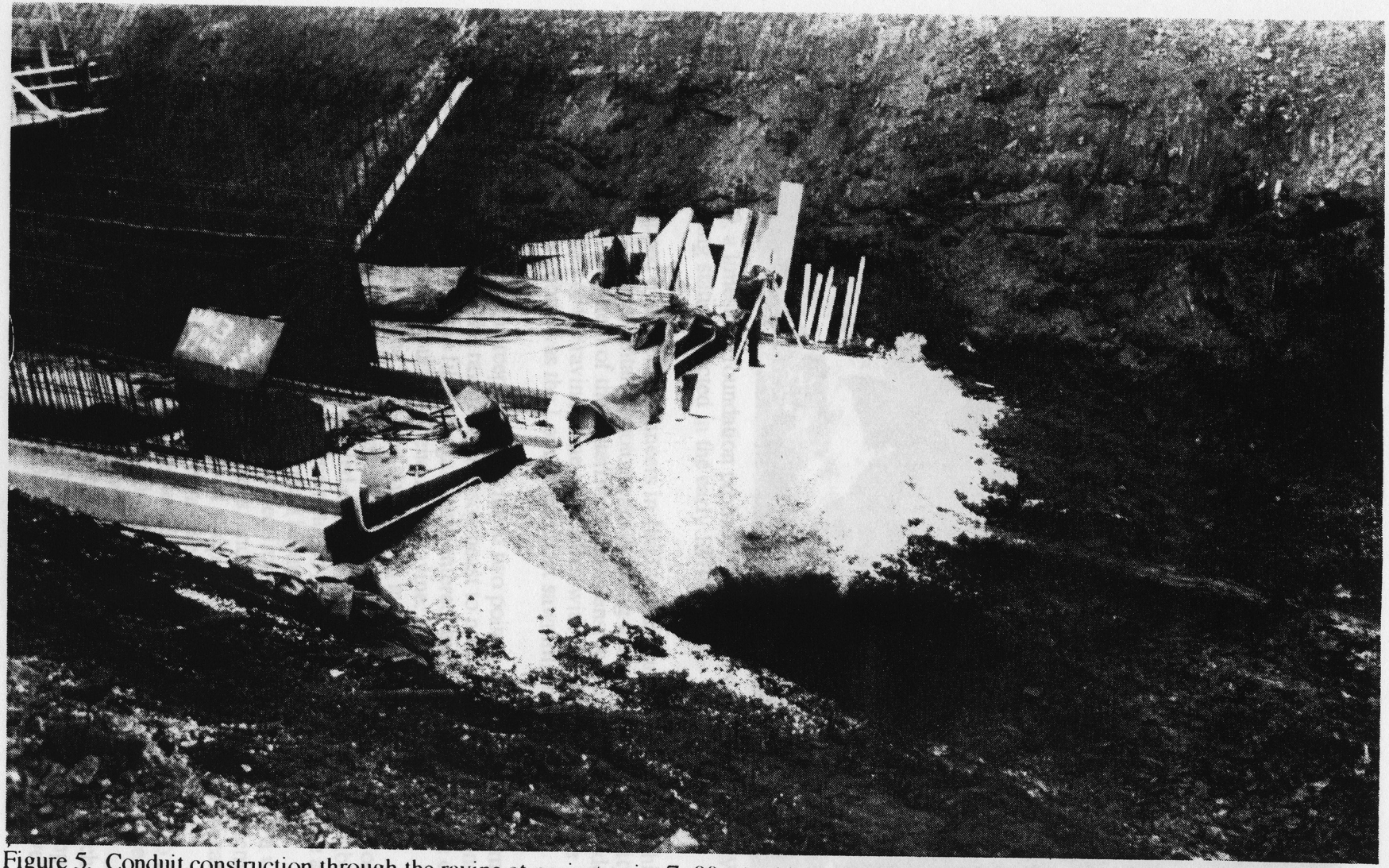

Figure 5. Conduit construction through the ravine at project point 7+00. At this point, the conduit trenching exposed several features in the ravine filled with wood by-products, including an enigmatic wooden trough or wall, and a limestone foundation of probable antebellum origin.

Figure 6. Feature 9, a limestone foundation probably associated with the Lookout Water Company pumping station erected in the early 1870s.

feature was first mapped by Federal engineers in 1863 (see Figure 2) in a topographic map of the town, and was also incidentally photographed during the occupation of the city in 1863-65. Postwar development of the waterfront was intensive, and either by accident or design, the lower reaches of the ravine came to be filled with industrial debris. The principal source of this debris was the Loomis and Hart sawmills and furniture manufacturing plant.

The RL-CSO trench intercepted the ravine at two points. In the interval from approximately 6+50 to 7+30 the ravine angled southeast to northwest across the conduit path. From 8+00 to 9+00 ravine fill was again encountered, and at this interval the conduit trench apparently ran across a southerly bend in the ravine.

Most of the bulk fill of the ravine below modern machine-redistributed fills consisted of sawdust and shavings. Several large hewn timbers were recovered at one point of the trench, and apparently represented elements of a timber structure probably associated with the sawmilling operation. One notched and dove-tailed timber bore a cast-iron female bearing nailed into a circular mortise (Figure 7).

A number of furniture parts were recovered from the ravine fill, including a variety of turned forms such as chair spindles, table legs, and bed posts. Most of these items bore the marks of lathe chucks on one or both ends of the piece, and were evidently discarded due to turning flaws or grain splits. Leather items were also preserved in the wet environment of the ravine fill. Many of these items are wide strips of leather in two layers fastened together with brass rivets or studs, and represent leather belting from power transmission systems. Belt driven machinery was common in post-Civil War manufacturing. Belt widths represented archaeologically range from a narrow 3 inches to 16 inches. Most of the examples were from splice points probably removed to compensate for stretching. A portion of a five inch wide 30 inch diameter belt pulley was recovered from the ravine fill.

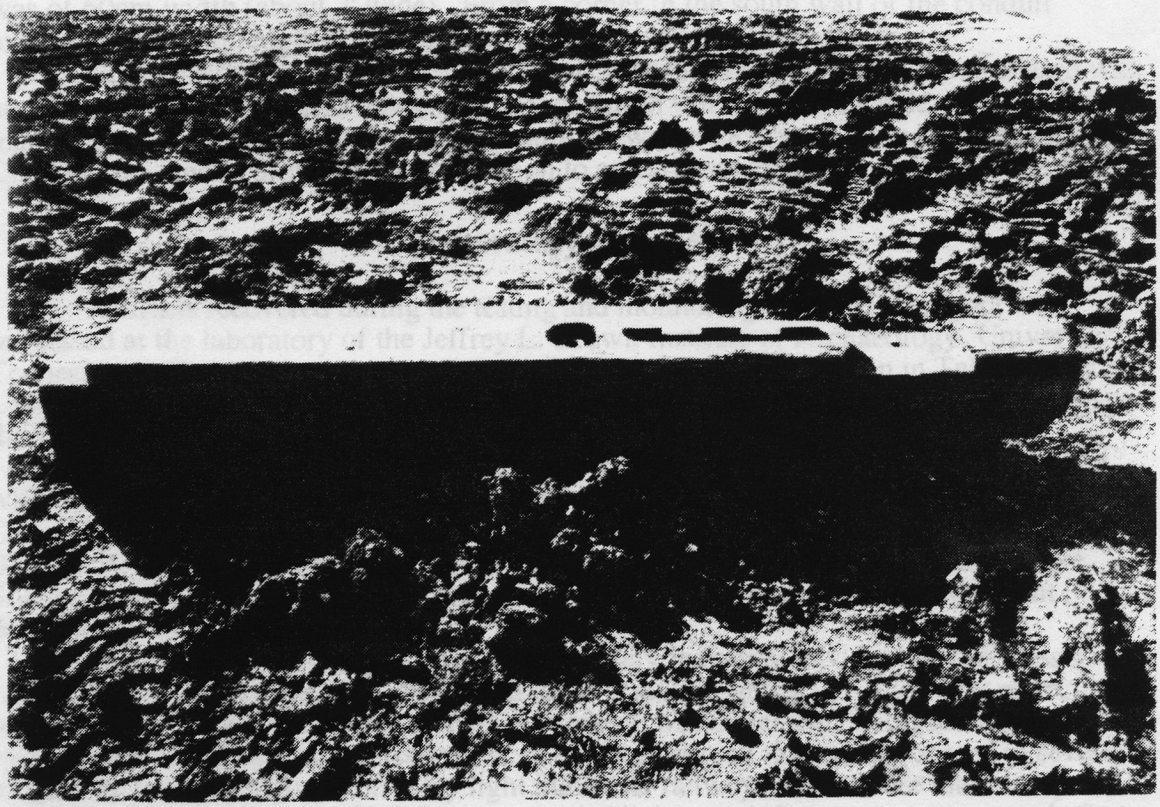

Figure 7. Structural wooden beam from the ravine fill. This heavy structural timber, cut from stock a foot square, was one of number of heavy wooden elements recovered from the ravine fill.

Feature 15 was a wooden construction exposed in the floor of the conduit cut at 7+00. The linear feature extended from southeast to northwest, and consisted of square uprights with heavy plank boarding on one side and lighter planking on the opposite side. Since this double-wall type of construction is typical of the construction of boat hulls, the feature was examined in detail to determine if it was in fact a steamboat hull, keel-boat hull, or barge remnant. A close inspection revealed that the uprights were square-sawn 4" by 4" timbers with lap notch joints. The heavy planking on one side of the feature was of 2 1/2" thickness in widths of 17" and 13 1/2". The lighter planking on the other side was 1" in thickness and in widths of 5" and 9". Paralleling one element of the feature was a second line of planking in mirror image arrangement, the thin planking being to the interior of the parallel lines of timber. The lower portions of both elements angled in, forming a trough-like construction.

Of immediate importance was the joinery of the feature. Square cut nails secured the planking and uprights and not treenails or bolts. The alignment of seams between board planking and uprights was not consistent with nautical practice. Clearly, Feature 15 was not any portion of a floating vessel of any type. This feature was on the east side of this portion of the ravine, and may have represented a retaining wall. Toppling of the upper levels of the wall may have produced the mirror-image parallel element. At times of high river levels, logs may have been floated up from the river directly to the sawmill, perhaps requiring that the sides of the ravine be revetted. Alternately, Feature 15 may have been a double-walled logway or timber sluice up which logs were dragged. Elevations confirmed that the feature sloped down from south to north.

Opposite Feature 15, on the west bank of this exposure of the ravine, the trenching intercepted the remnants of a limestone footing designated Feature 16. A portion of the wall angled magnetic north (355 degrees) across the floor of the conduit excavation, and

was of 60cm width (about 2' wide). From a corner in the south wall of the conduit excavation, a short length of wall angled west an indeterminate distance.

The limestone footing was of random-coursed rubble limestone, and mortared with an early-style lime and sand mortar. This foundation wall in the west side of the ravine may be attributable to an antebellum structure shown on Dorr's 1863 topographic map of Chattanooga, and is probably the foundation to an early sawmill.

Laboratory Analysis

Artifacts recovered during the testing and monitoring of the CSO project were processed at the laboratory of the Jeffrey L. Brown Institute of Archaeology, University of Tennessee at Chattanooga. A complete listing of the collection is given in Tables 1 and 2. Unfortunately, from an analytical standpoint, the collection has little scientific value, given the poor contextual control under which the items were recovered.

Domestic items from the collection include a brown glass liquor bottle associated with a nearby 19th-century industry, the White Oak Distillery of E. R. Betterton and Company. This plant was situated on the east side of the south landing of the Market Street Bridge. A ceramic stoneware bottle was also recovered, and is of British manufacture. Some fragments of white refined earthenware pottery were recovered, and represent domestic refuse.

Ferrous artifacts were common in the largely industrial environment of Ross's Landing. Electrolytic cleaning of selected items is still on-going. A face gear plate, possibly from the mechanism of a sawmill carriage, was collected. Tools are represented by a pick head and several file fragments. T-shaped railroad rail was recovered in several weights and sizes, ranging from very light industrial railway iron to more massive spur track T-rail. One example of a fish plate, a rail splicing track fixture, was recovered. Cast-iron machine plates and shaft fittings complement a miscellaneous assortment of metal objects such as spikes, nails, and carriage bolts.

No budgetary allowance was made for the conservation of organic materials from the site, specifically the wood and leather items recovered from the anerobic environment of the ravine. Stabilization and treatment of these items is still on-going and of necessity will extend over a period of years. Leather belting laminated with brass rivets is represented by seven specimens from the collection. The width of this belting varies from 16" to 3". Most of the fragments are from seams or joints evidently removed when a drive belt was shortened.

Some of the more significant remains include wooden furniture parts evidently associated with the Loomis and Hart operation at Ross's Landing. Both segments of the backfilled ravine intercepted in the first 800 feet of the CSO conduit trenching contained discarded furniture parts as well as masses of wood debris. Included in the furniture parts are bed posts, chair or bedstead stiles, and table legs. Historical data suggest that by the late 1880s, the ravine had been completely backfilled by sawmill and furniture manufacturing waste, leaving the recovered samples as some of the earliest artifacts reflecting industrial activities on the Chattanooga waterfront. Unfortunately, the stabilization of wood is a costly and time-consuming process, and at present, the specimens are temporarily being stored in water baths.

Curation

All artifacts and excavation records generated during the RL-CSO testing and monitoring are permanently curated at the laboratory of the Jeffrey L. Brown Institute of Archaeology, Brock Hall, University of Tennessee at Chattanooga.

Conclusions

In the opinion of the principal project personnel, no cultural resources potentially eligible for inclusion in the National Register of Historic Places were encountered in the Ross's Landing combined stormsewer overflow conduit excavations. While isolated remants of structures, as evidenced by stone, brick, and concrete footings, were present in the construction area, no well-integrated systems amenable to controlled testing were noted. Scattered artifacts, while demonstrative of some historic land uses, were generally not of analytical significance. Furniture parts from the ravine backfilled by the late 1880s are some of the few surviving examples of early Chattanooga industries, and will be preserved.

Modern construction impacts, particularly those associated with the construction of Riverfront Parkway, the Olgiati Bridge and the Ross's Landing Park, seriously degraded the integrity of archaeological resources in the project area prior to the CSO construction initiative. In few areas were undisturbed remnants of the Ross's Landing riverbank found, as would be evidenced by a normal soil profile. Truncation of site profiles by grading and subsequent redeposition left upper site profiles in turmoil. The fill of the historic ravine, encountered in two places by the CSO trench excavation, was thus a unique time capsule of industrial filling in the 1870s and 1880s. This archaeological secondary deposition of industrial wastes was adequately observed during the monitoring process.

A small quantity of aboriginal material was recovered in the initial backhoe testing of the CSO centerline, but there were no stratigraphic indications of an intensive occupation observed in the exposed profiles anywhere on the site. No aboriginal ceramic material was recovered as would evidence a habitation site of a sedentary population.

Acknowledgements

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